

Blood Chem Infection and Immune Dysregulation Review

The basic CBC markers are not sufficient to make any conclusive diagnoses of infection or immune dysregulation. For that, we need to do much more extensive testing to determine the presence and cause of infection. The diagnosis and treatment of infections—from tick-borne illnesses such as Lyme and Bartonella to intracellular infections such as Chlamydia pneumoniae and mycoplasma to reactivated viral infections such as Epstein-Barr—is one of the most complex and murky topics in medicine.

The CBC can be high or low in cases of infection and may highlight the need for further testing.

LAB AND FUNCTIONAL RANGES FOR INFECTION/IMMUNE MARKERS

| Marker | Lab range | Functional range |
|--------------------|---|-----------------------------------|
| WBC | 3.4–10.8 x 10 ³ /μL | 5.0–8.0 x 10 ³ /μL |
| Neutrophils | Relative: 49–74% Absolute: 1.4–7.0 x 10 ³ /μL | Relative: 40–60% Absolute: N/A |
| Lymphocytes | Relative: 26–46% Absolute: 0.7–3.1 x 10 ³ /μL | Relative: 25–40% Absolute: N/A |
| Monocytes | Relative: 2–12% Absolute: 0.1–0.9 x 10 ³ /μL | Relative: 4–7% Absolute: N/A |
| Eosinophils | Relative: 0–5% Absolute: 0.0–0.4 x 10 ³ /μL | Relative: 0–3% Absolute: N/A |
| Platelets | 150–379 x 10 ³ /μL | 150–379 x 10 ³ /μL |

White blood markers for infection lack specificity and sensitivity. You need to follow up with more specific testing to confirm/rule out. Below are a few general patterns:

| Marker | Acute bacterial infection | Acute viral infection | Acute parasitic infection | Chronic Infection | Allergies |
|--------------------|---------------------------|-----------------------|---------------------------|----------------------|----------------------|
| WBC | High | High | High | Low | Low, Normal, or High |
| Neutrophils | High | Low | | Low, Normal, or High | |
| Lymphocytes | Low | High | | Low, Normal, or High | |
| Monocytes | High | High | High | High | |
| Eosinophils | | | High | | High |

In an acute parasitic infection, we'd expect high white blood cell count and high eosinophils. Eosinophils are drawn to areas of inflammation through chemotaxis, at which point they activate and release substances contained within their granules. Eosinophilia has many potential causes, grouped into seven broad categories: infection, allergy, neoplasm, lung disorders, skin disorders, and miscellaneous conditions. We can't assume that high eosinophils are necessarily caused by a parasite infection, but that's certainly one possibility.

| Marker | Autoimmunity | Inflammation | Cancer |
|--------------------|--------------|--------------|-------------|
| WBC | Low | High | High or Low |
| Lymphocytes | Low | High or Low | High or Low |
| Neutrophils | Low | High | Low |
| Platelets | High or low | | High or Low |
| CRP | High | High | |
| Ferritin | High | High | |
| Vitamin D | Low | | |
| HDL | High | High | |
| Monocytes | | | High or Low |
| Eosinophils | | | High |

T-lymphocytes are the prime players in cell-mediated immunity, and they play an important role in fighting viral infections.

THROMBOCYTOSIS: ELEVATED PLATELET COUNTS

- Typically elevated in hematologic conditions (cancer and noncancer).
- Can be caused by inflammation and autoimmunity.
- If a patient doesn't have iron-deficiency anemia but has high platelets, retest them.
- If persistently elevated, refer to hematologist.

THROMBOCYPENIA: LOW PLATELET COUNT

- Bone marrow is not making enough platelets.
- Platelets are being destroyed in the bloodstream.
- Liver or spleen is removing platelets from circulation.
- Genetic (nonpathological) (typically 5 to 10 percent below the lab reference range).
- If levels are persistently low, refer to a hematologist.

The treatment of infection and immune dysregulation and autoimmunity depends on the cause.

